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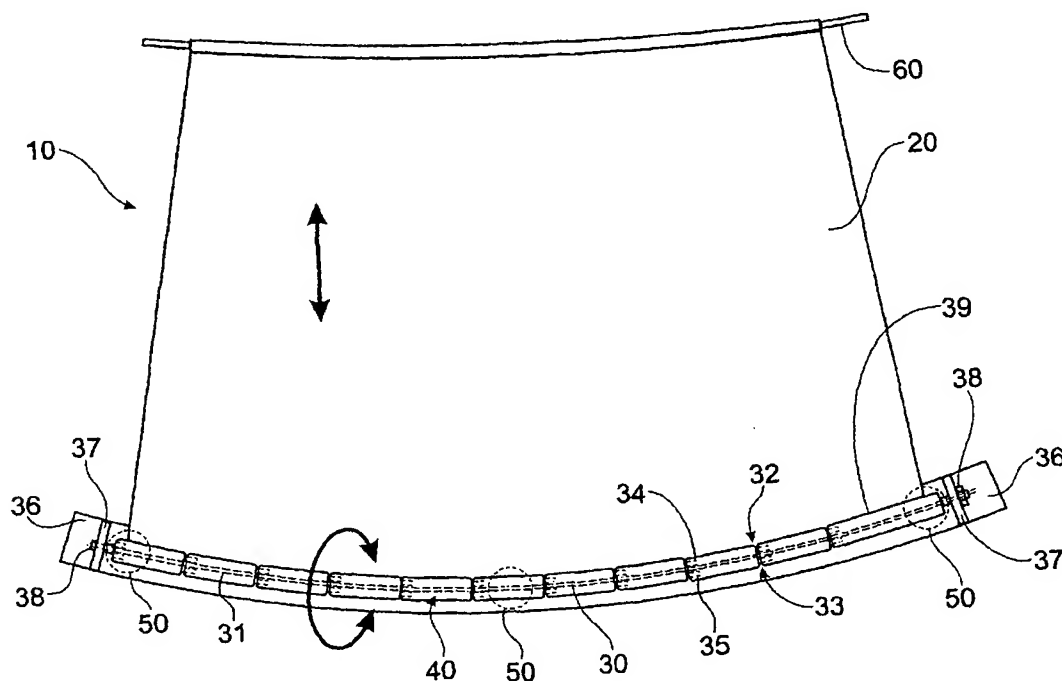
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

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(54) Title: **ROLLER BLIND**



(57) Abstract: A curved roller blind assembly (10) that may be used with a curved surface, for example a windscreen of an automobile. The curved roller blind (10) is securable to the surface and comprises an arcuate rod (30) having a roller (40) comprising at least one rotatable member (31). A blind (20) attached to the roller (40) may be extended and retracted from the roller (40).

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TITLE

"ROLLER BLIND"

FIELD OF THE INVENTION

The invention relates to a roller blind. In particular, the invention
5 relates to a roller blind for use with a curved surface, for example an automobile
windscreen.

BACKGROUND OF THE INVENTION

Roller blinds are known for covering surfaces and are typically
used to cover windows. Often the window is flat so that a typical straight roller
10 blind can be attached adjacent the window and easily pulled down, or up, to
cover the window. Attaching a typical roller blind to a curved window results in
an unsightly gap between the window and blind. Such a gap may further be
undesirable, for example, in the case where an item located in the gap is
exposed to damaging sunlight shining through the adjacent window.

15 Automobile manufacturers typically curve the windscreen to
enhance aerodynamic performance of the automobile. A shade covering may
be placed on an inner surface of the windscreen to provide shade and
protection of an interior of the automobile from ultraviolet radiation (UV)
damage from sunlight. A typical windscreen shade covering comprises a
20 foldable rigid or semi-rigid material, for example cardboard, which can be
unfolded in use and located on an interior side of a windscreen. These
coverings are typically flat or substantially flat when unfolded and are not
attached to the windscreen. These types of coverings are often clumsy and
inconvenient to store when not in use.

A roller blind may be used to cover an automobile windscreen and is typically attached to the windscreen or dashboard. This provides a suitable means for storing the blind, which is retracted when driving and a means for extending the blind in use to cover the windscreen. A typical roller of a roller blind is straight and is therefore poorly suited for use in relation to a curved windscreen. In particular, the blind cannot closely conform to the curved configuration of the windscreen because of the curvature of the windscreen and linear shape of the roller. This results in a gap between the blind and the edge of the window that may permit damaging sunlight to pass to the automobile dashboard, which may result in UV damage. Also, a straight roller, not conforming to a curved windscreen, may obstruct the dashboard and is unsightly.

US Patent No. 5,067,546 describes an invention relating to a roller blind for an automobile comprising a housing having a curved guide slot and a curved pull bar adapted for use on a curved automobile windscreen. The housing accommodates a straight roller for rolling and unrolling the blind. This roller blind requires a curved guide slot on the housing to guide the blind to cover the curved windscreen. A roller blind having a housing is undesirable as it is cumbersome and may require removal and/or alteration of standard features of an automobile to install.

In light of the above, there is an need for a suitable roller blind for use with a curved windscreen or other curved window.

SUMMARY OF THE INVENTION

In accordance with a first aspect of the invention, a curved roller

blind is provided comprising:

- (i) at least one attachment member;
- (ii) an arcuate rod attached to the attachment member(s);
- (iii) a roller located substantially co-axially with the arcuate rod
5 and rotatably mounted thereto; and
- (iv) a blind attached to the roller.

Preferably, the attachment member(s) are attached to the arcuate rod at opposite ends of said rod.

Preferably, the attachment member(s) are brackets.

10 The bracket(s) are preferably attachable to a surface by at least one fastener.

More preferably, the fastener(s) is a suction cup.

The attachment member in one form is secured to a support member.

15 The support member preferably has a length and curvature substantially similar to the arcuate rod.

Preferably, the support member is attachable to a surface by at least one fastener.

More preferably, the fastener(s) is a suction cup.

20 The arcuate rod may be hollow or solid.

Preferably, the arcuate rod is rigid.

In one form the arcuate rod extends through an aperture centrally located along an axis of the roller.

Preferably, the roller is cylindrical.

The roller may comprise a plurality of members.

Preferably, each of the members is connected to an adjacent member.

In one form, each of the members may be connected by at least one male connector located on a first member, which is insertable into a receiving female connector of a second member.

In another form, each of the members are connected by a substantially flexible covering located at least partially around each of the members.

In yet another form, each of the members are inter-locking tube shaped members.

In still another form, the roller comprises a single member.

Preferably, the single member is flexible.

Preferably, the roller of the first aspect is biased to retract the blind.

More preferably, the roller is biased by a spring mechanism.

The roller blind of the first aspect may further comprise a pull bar attached to the blind at an end of the blind located opposite an end attached to the roller.

Preferably, the pull bar is arcuate.

In a second aspect, the invention provides a roller blind assembly comprising:

- (a) a support member;
- (b) an arcuate rod attached to the support member via

attachment member(s);

(c) a roller located substantially co-axially with the arcuate rod and rotatably mounted thereto; and

(d) a blind attached to the roller.

5 Preferably, the support member has a length and curvature substantially similar to said arcuate rod.

Preferably, the support member has at least one fastener for attaching the assembly to a surface.

It will be appreciated that the roller blind may be used for covering
10 any surface and that reference to use with an automobile windscreen is merely one use of the invention. For example, the roller blind may be used to cover a window or wall of a building.

DESCRIPTION OF THE DRAWINGS

In order that the invention may be readily understood and put into
15 practical effect, preferred embodiments will now be described by way of example with reference to the accompanying drawings wherein like reference numerals refer to like parts and wherein:

FIG. 1 is plan view of the roller blind of the invention shown with a blind extended away from the roller;

20 FIG. 2 shows two members of a roller separated from each other with male pins and female receiving apertures indicated;

FIG. 3 shows a perspective view of the two members in FIG. 2 without an arcuate rod for clarity;

FIG. 4 shows two members connected by an outer covering or

sleeve;

FIG. 5 shows members as inter-locking tubes;

FIG. 6 shows a single flexible member; and

FIG. 7 shows two members having an internal channel for
5 receiving an arcuate rod.

DETAILED DESCRIPTION OF THE INVENTION

FIG. 1 shows an embodiment of roller blind 10 comprising an arcuate rod 30, a roller 40 formed by a series of connected members 31 located along the arcuate rod 30. Connected members 31 are rotatable around
10 rod 30. A rotatable spring mechanism 39 shown located at an end of roller 40 biases roller 40 for retracting blind 20 shown extended from roller 40.

Arcuate rod 30 is rigid and solid, however it may also be hollow and semi-rigid. Arcuate rod 30 may be made of any suitable material, for example steel. A length of arcuate rod 30 may be determined based in part on
15 a length of a surface to be covered. For example, length of arcuate rod 30 may be substantially the same length of a windscreen so that the total length of roller blind 10 matches the length of the windscreen thereby providing maximal or near maximal coverage of the windscreen.

Members 31 are shown as cylindrical, but other shapes may be
20 implemented, for example hexagonal shaped members. Member 31 is rigid, but may also be flexible or semi-flexible. A particular length of member 31 may be selected by a skilled person. However, it will be appreciated that a maximal length of a member 31 may depend at least in part on the curvature of arcuate rod 30. In particular, to allow member 31 to rotate around arcuate rod 30, a

maximal length of member 31 is shorter for a tighter curved (i.e. shorter radius of curvature) rod 30 than for a wider curved rod (i.e. longer radius of curvature).

A particular length and diameter of member 31 that allows rotation around a curved rod can be determined by a person skilled in the art.

5 Members 31 are able to rotate around arcuate rod 30 because adjacent members 31 are located slightly further apart from each other at side 33 (outer side of curve) compared to side 32 (inner side of curve) as shown. This arrangement results in a shorter internal radius for inner side 32 and longer external radius for outer side 33. This arrangement allows adjacent
10 members 31 to rotate about arcuate rod 30. Adjacent members 31 are shown contacting each other at side 32. However, this need not be the case for all embodiments for the invention. For example, a gap may be present at sides 32 and 33 such that end surfaces of members 31 are spaced apart from each other as shown for example in FIG. 4. However, adjacent members 31 are
15 preferably still connected to each other and rotate in unison.

 Members 31 can be of any diameter, but it will be appreciated that a greater diameter of member 31 requires less rotations to retract bind 20. However, a small diameter may be aesthetically desired to minimise size of roller 40. The diameter of member 31 may accordingly be selected by a skilled
20 person.

 Adjacent members 31 are connected to each other by a connecting means. In a preferred embodiment, the connecting means comprises male pins 34 and female receiving apertures 35 located on respective discs 41 and 42, which are attached to opposite ends of member 31,

as shown in FIGS. 2 and 3. Preferably mating or joining of respective pins 34 and receiving apertures 35 is a loose fit allowing flexibility between adjacent members 31. The length of male pin 34 can be determined by a person skilled in the art.

5 As described hereinafter in one embodiment, members 31 have a substantially hollow tube-like interior and discs 41 and 42 provide end supports for pins 34 and apertures 35. Discs 41 and 42 also provide additional strength to an attachment point of the pins 34 to the member 31 and also provide additional strength to apertures 35. Although FIGS. 2 and 3 show ends of
10 members 31 having discs 41 and 42, these discs may be omitted and pins 34 and apertures 35 may be formed as an integral part of member 31, for example as a single moulded piece.

A pair of pins 34 and receiving apertures 35 is shown for each adjacent member, however, any number of pins and receiving apertures may
15 be used. Pins 34 and receiving apertures 35 may also have cross sectional shapes other than round, for example square, triangular, and the like. It will be appreciated that a non-round cross section may be desired to if only a single pin is used for additional stability between adjacent members 31.

FIGS. 2 and 3 show two members 31 separated to illustrate male
20 pins 34 and female receiving apertures 35. Rod 30 is shown located substantially co-axially relative to members 31 and rotateable thereabout. Members 31 are connected or joined to each other by way of the pins 34 and receiving apertures 35 so that the members 31 rotate in unison. This prevents uneven winding and unwinding of blind 20 around roller 40. Although pins 34

and apertures 35 are shown by way of example, other connecting means may be used that allow members 31 to rotate in unison as described below.

In another embodiment shown in FIG. 4 members 31 may be connected by a connecting member comprising a substantially flexible outer covering or sleeve 90 so that all members 31 rotate together. In this embodiment, pins and receiving apertures are not necessary. Adjacent members 31 are able to rotate around rod 30 by the flexing between each member while rotating. It will be appreciated that the flexible covering need not be continuous across an entire length of the rod and the covering may be discontinuous or only partially cover a member so long as adjacent ends of members 31 are interconnected by the covering.

In a further embodiment shown in FIG. 5, members 31 comprise inter-locking tubes 91 wherein one tube is at least partially insertable into and retainable by an adjacent tube. As shown in FIG. 5, end 93 of member 91 has a smaller diameter than end 94. Adjacent inter-locking tube members 91 are flexible at joining region 92. To prevent possible shifting of an attached blind towards one end of the roller blind, members 91 can be arranged to inter-lock as mirror images of each other relative to a central point on the rod. Also, each interlocking tube member 91 is pivotable relative to an adjacent tube member 91, but is linked so that all tube members 91 rotate in unison.

In another embodiment shown in FIG. 6, the roller 40 comprises a single member 95, which is flexible. It will be appreciated that in use, a single flexible member will be capable of rotating around arcuate rod 30. An example of a single flexible member is a tube comprising an accordion-like flexible wall.

The flexible wall can have a spiral shape or can comprise essentially a series of substantially vertical discs 96 inter-connected by a flexible joining regions 97.

In all of the abovementioned embodiments, members 31 are joined so that members 31 can rotate around arcuate rod 30 in unison.

5 Discs 41 and 42 each have centrally located apertures 43 which position rod 30 co-axially or centrally along an axis of member 31 as shown. Member 31 have an aperture of any size larger than a diameter of arcuate rod 30, which allows arcuate rod 30 to pass through each aperture 43. Member 31 in one embodiment is substantially hollow so that arcuate rod 30 can pass
10 though the member 31 and member 31 can rotate around rod 30. Alternatively, in another embodiment shown in FIG. 7 member 31 comprises a channel extending internally of member 31 and substantially central thereto that permits rod 31 to pass there through. The channel would need to have a diameter large enough to allow rotation of member 31 around arcuate rod 30.

15 Members 31 may contact rod 30 by way of bearings, bushes, friction reducing surface, eg. a Teflon washer, or the like. Use of bearings, bushes, friction reducing surface or the like may improve rotation of members 31 around rod 30. This may also reduce wear.

20 Blind 20 can be any rollable material, preferably selected based on requirements of the blind when in use. For example, the material may be opaque, semi-opaque, transparent, or webbed. Preferably, blind 20 is opaque or tinted when used to cover an automobile windscreen. Material 20 is preferably made of a durable material, in particular a material resistant to UV damage. The material may be reflective and/or insulating. Blind 20 is

preferably not substantially stretchable in a direction perpendicular to roller 10, i.e. the direction blind 20 is pulled when to be extended.

Blind 20 is attached to roller 40 by tape. However, blind 20 can be attached to roller 40 using, for example, glue, a retaining clip or retaining slot. Use of a retaining clip or retaining slot may attach blind 20 to roller 31 without a need for an adhesive such as glue or tape.

A pull bar 60 is shown attached to blind 20 at an end opposite an end attached to members 31. Pull bar 60 is useful to assist holding blind 20 when extending or retracting. Pull bar 60 is shown curved, however, it may be linear or have other suitable shapes.

A support member 36 is shown as an elongate curved flat bar having a substantially similar curvature and length as the arcuate rod 30. Support member 36 matching, or nearly matching the curvature and length of arcuate rod 30 allows the roller blind 10 attached to the support member 36 to be located adjacent and in close proximity to windscreen. Arcuate rod 30 is attached to support member 36 by attachment members 37 shown as brackets located at opposite ends of support member 36. Rod 30 attaches to brackets 37 by way of fasteners 38. Fasteners 38 may include for example, a bolt, screw, rivet, weld or other suitable means. The roller blind 10 attached to support member 36 forms an assembly that can be attached to a surface. For example, support member 36 may be attached to a windscreen or dashboard.

When the embodiment shown in FIG. 1 is in use with an automobile windscreen, roller blind 10 is secured to the windscreen with suction cups 50 attached to a bottom side of support member 36 shown in FIG. 1 in

phantom. However, support member 36 may be secured to other surfaces, for example an automobile dashboard. Support member 36 may be secured to the surface by means other than suction cup 50, for example a bolt, screw or rivet. However, suction cups 50 are convenient for easy installation and removal of
5 roller blind 10.

In another embodiment, support member 36 may be omitted and brackets 37 may be attached directly to a surface. For example, brackets 37 may be attached directly to a windscreen, dashboard or any other suitable surface by suction cups or other means as described herein.

10 Blind 20 may be extended by pulling on pull bar 60, thereby unwinding blind 20 from roller 40. There may be hooks or the like (not shown) located at the top of the windscreen to secure pull bar 60 extended and covering the windscreen. When blind 20 is to be retracted, pull bar 60 is unhooked and tension provided by spring 39 retracts blind 20. Blind 20 is thus
15 wound around roller 40 and conveniently stored.

It is understood that the invention described in detail herein is susceptible to modification and variation, such that embodiments other than those described herein are contemplated which nevertheless fall within the broad scope of the invention. For example, rollers described above are
20 examples of difference embodiments of the invention and a skilled person could select a roller that achieves the same intended function of rotation about an arcuate rod as described above. Also, the examples and figures relate to use of the curved roller with a roller blind to cover a windscreen. However, it is understood that the roller and roller blind of the invention could be used to

cover any number of surfaces; for example, a window of a building.

CLAIMS

1. A curved roller blind comprising:
 - (i) at least one attachment member;
 - 5 (ii) an arcuate rod attached to the attachment member(s);
 - (iii) a roller located substantially co-axially with the arcuate rod and rotatably mounted thereto; and
 - (iv) a blind attached to the roller.
2. The roller blind of claim 1 wherein said attachment member(s) are
10 attached to the arcuate rod at opposite ends of said rod.
3. The roller blind of claim 1 wherein said attachment member(s) are brackets.
4. The roller blind of claim 3 wherein the bracket(s) are attachable to a surface by at least one fastener.
- 15 5. The roller blind of claim 4 wherein the fastener(s) is a suction cup.
6. The roller blind of claim 1 wherein the attachment member is secured to a support member.
7. The roller blind of claim 6 wherein the support member has a length and curvature substantially similar to said arcuate rod.
- 20 8. The roller blind of claim 6 wherein the support member is attachable to a surface by at least one fastener.
9. The roller blind of claim 8 wherein the fastener(s) is a suction cup.
10. The roller blind of claim 1 wherein the arcuate rod is hollow or solid.
- 25 11. The roller blind of claim 1 wherein the arcuate rod is rigid.

12. The roller blind of claim 1 wherein the arcuate rod extends through an aperture centrally located along an axis of the roller.
13. The roller blind of claim 1 wherein the roller is cylindrical.
14. The roller blind of claim 1 wherein the roller comprises a plurality
5 of members.
15. The roller blind of claim 14 wherein each of said members is connected to an adjacent member.
16. The roller blind of claim 15 wherein each of said members are connected by at least one male connector located on a first member, which is
10 insertable into a receiving female connector of a second member.
17. The roller blind of claim 15 wherein each of said members are connected by a substantially flexible covering located at least partially around each of said members.
18. The roller blind of claim 14 wherein each of said members is an
15 inter-locking tube shaped member.
19. The roller blind of claim 1 wherein the roller comprises a single member.
20. The roller blind of claim 19 wherein the single member is flexible.
21. The roller blind of claim 1 wherein the roller is biased to retract the
20 blind.
22. The roller blind of claim 21 wherein the roller is biased by a spring mechanism.
23. The roller blind of claim 1 further comprising a pull bar attached to the blind at an end of the blind located opposite an end attached to the roller.

24. The roller blind of claim 23 wherein the pull bar is arcuate.

25. A roller blind assembly comprising:

(a) a support member;

(b) an arcuate rod attached to the support member via attachment member(s);

(c) a roller located substantially co-axially with the arcuate rod and rotatably mounted thereto; and

(d) a blind attached to the roller.

26. The assembly of claim 25 wherein the support member has a length and curvature substantially similar to said arcuate rod.

27. The assembly of claim 25 wherein the support member has at least one fastener for attaching said assembly to a surface.

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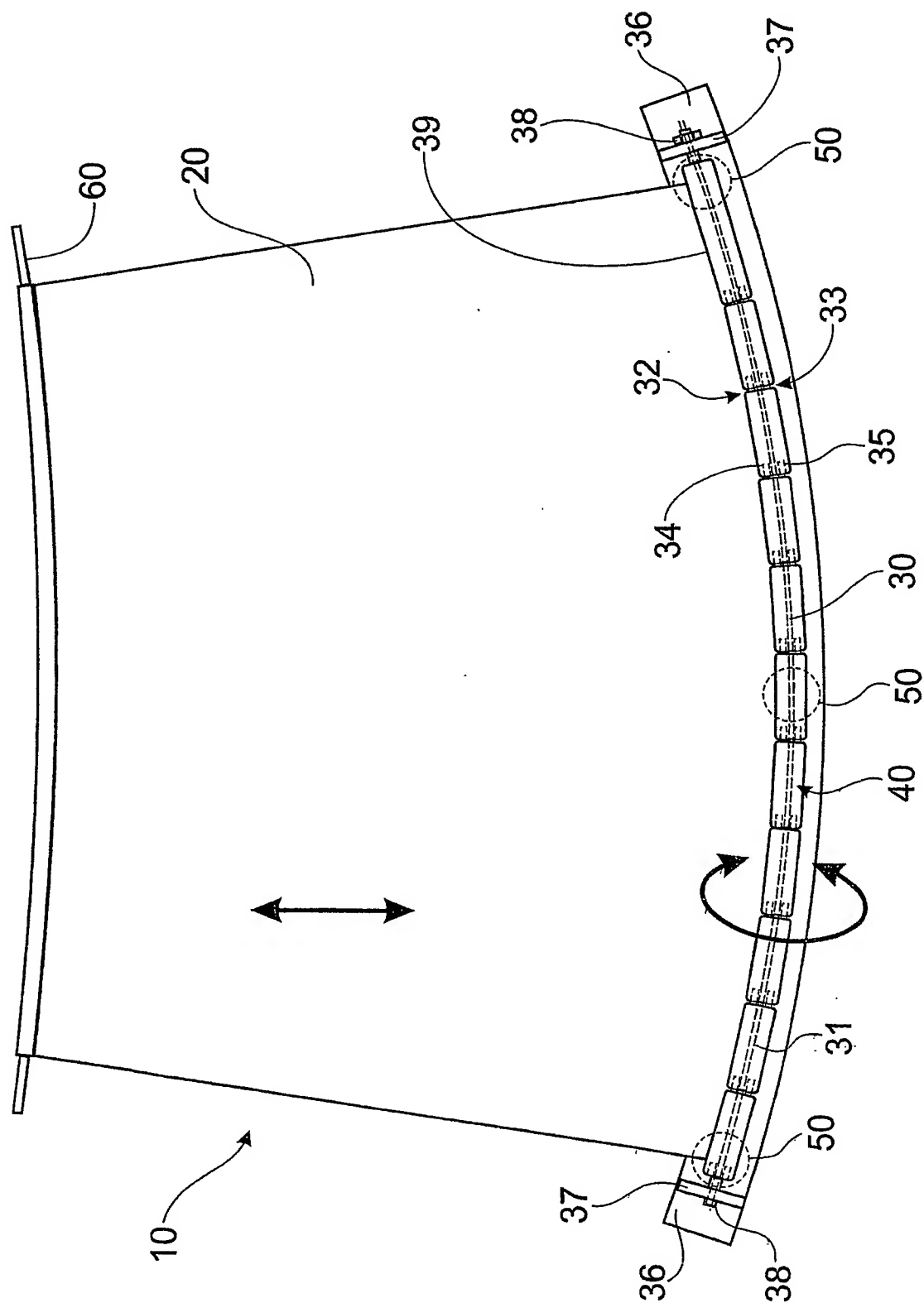
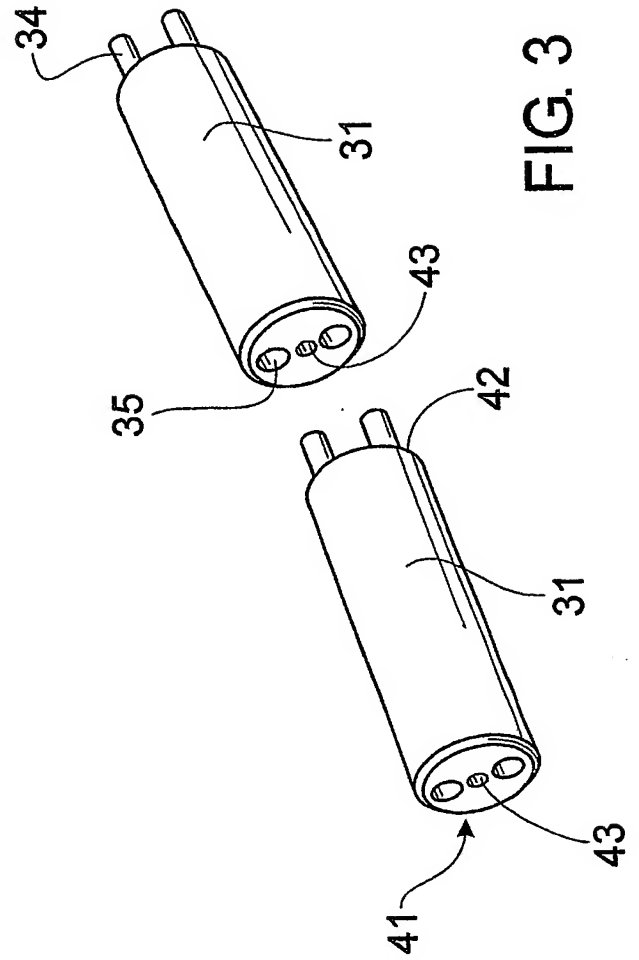
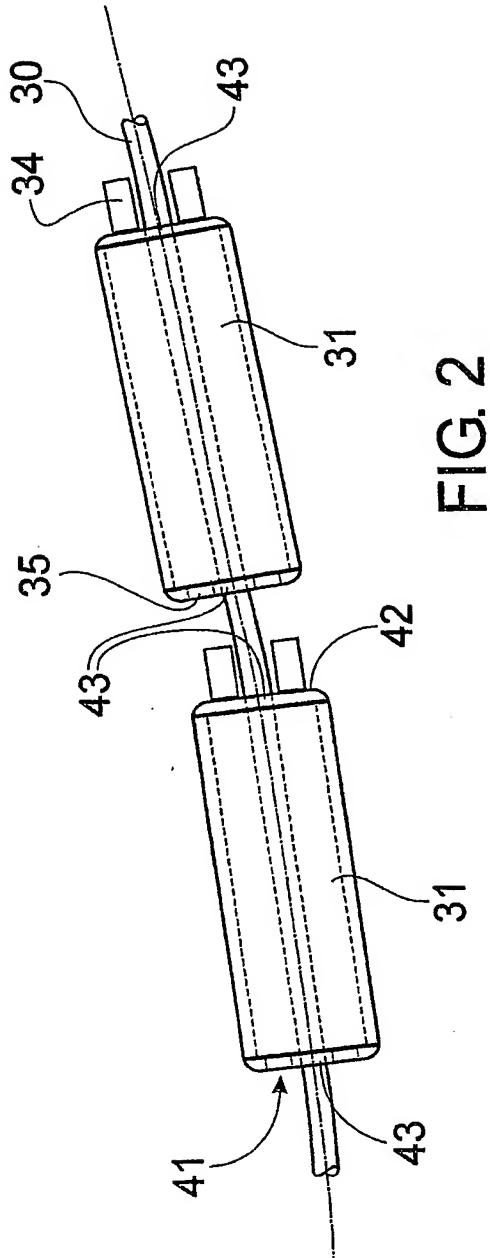


FIG. 1



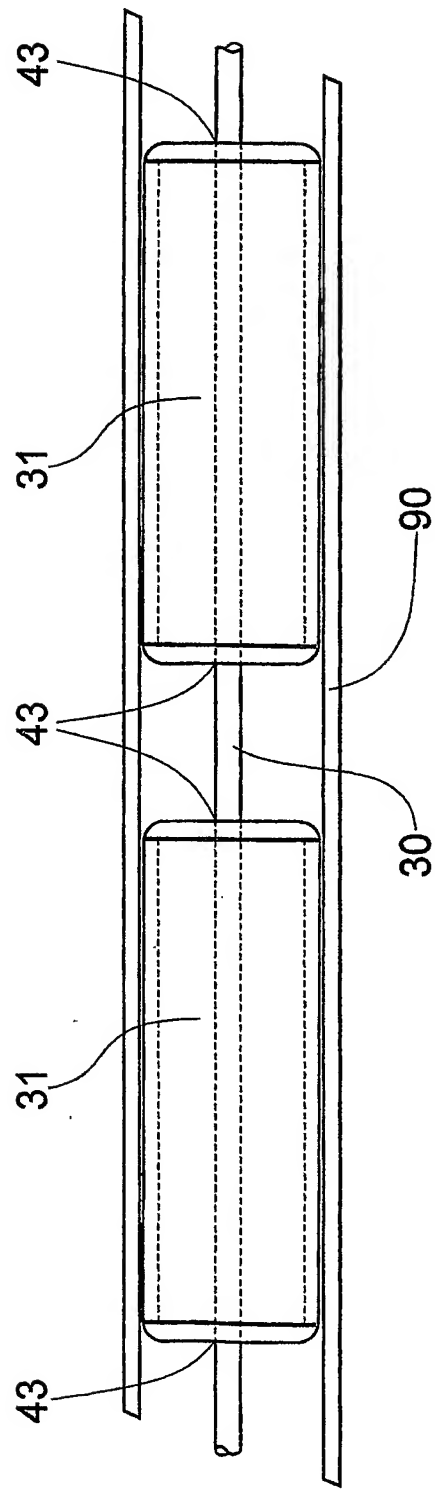


FIG. 4

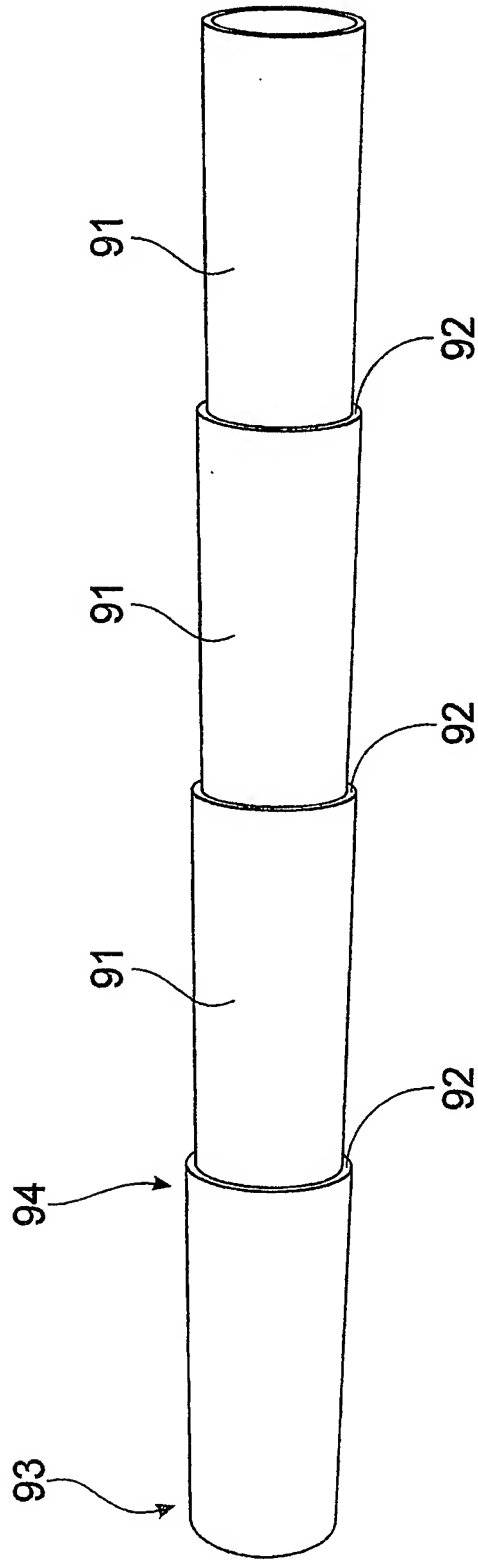


FIG. 5

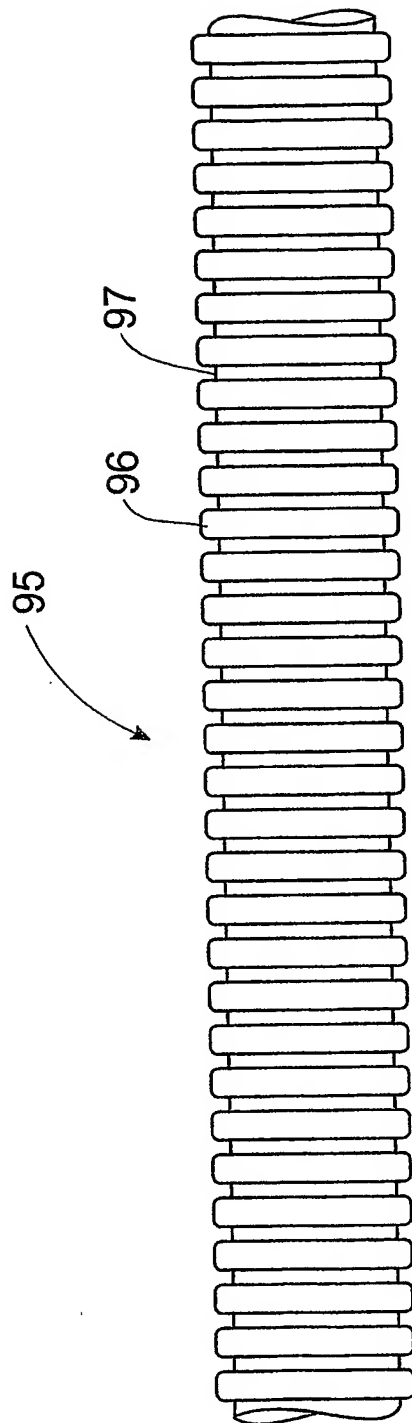


FIG. 6

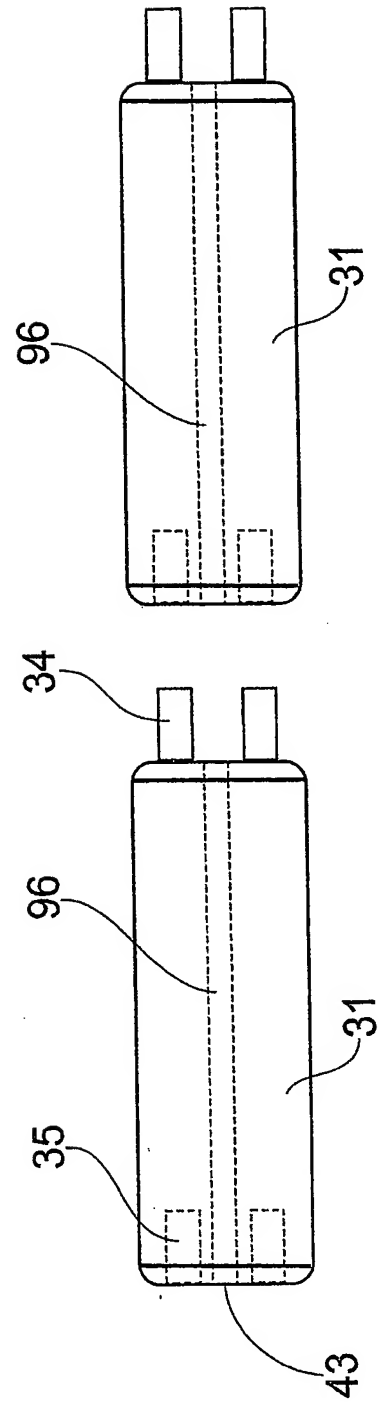


FIG. 7

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU02/01287

A. CLASSIFICATION OF SUBJECT MATTERInt. Cl. ⁷: B60J 1/20, E06B 9/40, 9/42

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

DWPI: 1.E06B or B60J or A01G 9/ and roller and blind etc and arcuate etc

2.E06B or B60J and roller and screen and arcuate etc

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3075805 A (GOLDE et al) 29 January 1963 fig 3	1-27
X	US 3069198 A (WINN) 18 December 1962 fig 1	1-27
X	US 516018 A (LAUER) 6 March 1894 figs 1,2	1-27

☒ Further documents are listed in the continuation of Box C☒ See patent family annex

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

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"P" document published prior to the international filing date but later than the priority date claimed

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

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Date of the actual completion of the international search
1 October 2002

Date of mailing of the international search report

7 OCT 2002

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU02/01287

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6079474 A (LIN) 27 June 2000 figs	1-27
X	EP 931682 A (WAGON AUTOMOTIVE) 28 July 1999 abstract	1-27
X	US 6062147 A (FOOTITT et al) 16 May 2000 figs	1-27
X	DE 20015145 U (LIN) 14 December 2000 abstract	1-27
X	FR 2779475 A (FARNIER ET PENIN SNC) 10 December 1999 abstract	1-27

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/AU02/01287

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report			Patent Family Member			
US	6079474	NONE				
EP	931682	FR	2774123	JP	11294043	
US	6062147	AU	98216/98	DE	19900506	NZ 329574
		NZ	504541			
DE	20015145	NONE				
FR	2779475	NONE				
END OF ANNEX						